REMARKS

Applicants respectfully request that the above-identified application be re-examined.

The August 28, 2003, Office Action ("Office Action") rejected all of the claims (1-23) of the above-identified application. Claims 1-5, 7-9, 12, 20, and 22 were rejected under 35 U.S.C. § 102(e) as being anticipated by the teachings of U.S. Patent No. 6,233,624 (Hyder et al.). Claims 6, 10-11, 13-19, 21, and 23 were rejected under 35 U.S.C. § 103(a) as being unpatentable in view of the teachings of Hyder et al. taken in view of the teachings of U.S. Patent No. 5,978,815 (Cabrera et al.). Independent Claims 1, 13, and 20-23 have been amended to more clearly point out and distinctly claim the subject matter applicants regard as their invention. A draft set of the proposed claim amendments were submitted to the Examiner for consideration on November 4, 2003. On December 15, 2003, applicants' undersigned attorney briefly discussed by telephone the amended claims with Examiner Ho, who suggested that applicants submit in writing the reasons why applicants believe that the claims are allowable. Applicants thank Examiner Ho for the courtesy shown during the telephone conversation. This submission is in accordance with the Examiner's suggestion.

Prior to discussing the reasons why applicants believe that the amended claims in this application are allowable, a brief discussion of the present invention, followed by a brief discussion of the cited and applied references, is presented. The following discussion of applicants' invention and the cited and applied references is not provided to define the scope or interpretation of any of the claims in this application. Instead, these discussions are provided to help the United States Patent and Trademark Office ("the Office") better appreciate important claim distinctions discussed thereafter.

Summary of the Invention

The present invention addresses one of the shortcomings of supporting a kernel mode driver that provides management and diagnostic data in enterprise networks, namely, the burden associated with the need for manufacturers to independently develop software methods and functions to incorporate into device drivers in order to support a device driver monitor and control management system, such as the Windows Management Instrumentation ("WMI") system. A device driver monitor and control management system, such as the WMI system, monitors information provided by and actions performed by device drivers and issues messages to device drivers.

The prior art need for manufacturers to independently develop software methods and functions to incorporate into device drivers has created a burden shared by every developer of device drivers intended to be used with a device driver and monitor control management system.

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Additional time is required for each developer to produce both the code specific to the developer's device and the code specific to the device driver and monitor control management system. Further, because similar code is often included in the device drivers that support the device driver monitor and control management system, functionally identical code is often loaded into memory by several drivers. The result is an inefficient operation that requires more overhead than necessary to support the device driver and monitor control management system. Overall system performance may suffer. Also, the likelihood of encoding errors or "bugs" is increased due to many disparate developers creating code that performs substantially the same function.

The present invention addresses the above-described needs and disadvantages by providing a set of common software routines that may be accessed by device drivers in support of a device driver and monitor control management system that monitors information provided by and actions performed by device drivers and that issues messages to device drivers. The set of common routines includes typical routines that would ordinarily be executed by device drivers designed to function with such a device driver and monitor control management system. The common routines reside in a library, dynamically accessible by the device drivers. When a device driver receives a message from such a device driver monitor and control management system, if appropriate, the device driver passes the message to the library to be handled in a common manner. In this manner, the developers of device drivers that support the device driver monitor and control management system need develop only the code necessary to support any unique features or data storage of the hardware associated with the device drivers. The result is shortened development time and fewer programming errors. In addition, the overall system performance may be improved because fewer instances of similar code are loaded in memory to support the device driver monitor and control management system. The present invention is particularly advantageous in enterprise networks, i.e., networks that include multiple devices, such as printers, fax machines, etc., that interact with multiple driving sources, such as computers, work stations, etc.

One exemplary embodiment of the present invention provides an extension to a device driver operating in kernel mode. This exemplary embodiment allows instrumentation data, such as data to configure device settings and supply event notification from device drivers, to pass between user and kernel mode. Such data passage allows a device driver monitor and control management system that monitors information provided by and actions performed by device drivers and that issues messages to device drivers to access device drivers, even if they are kernel mode drivers. Device driver monitor and control management system access is provided by a set

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of common software routines that may be accessed by device drivers in support of the device driver monitor and control management system. The common routines include typical routines that would ordinarily be executed by device drivers designed to operate with a device driver monitor and control management system that monitors information provided by and actions performed by device drivers and that issues messages to device drivers. The common routines reside in the common driver library accessible by the device drivers. When a device driver receives a message from the device driver monitor and control management system, if appropriate, the device driver passes the message to the library to be handled in a common manner.

In addition to the other advantages described above, the use of common routines stored in a library allows the stored routines to be modified without affecting the related drivers so long as each driver's interface to the library is maintained.

U.S. Patent 6,233,624 (Hyder et al.)

Hyder et al. provides a system for incorporating a link layer intermediate driver into a data flow path in a computer operating system. The data flow path is a path of execution that is traversed through a network protocol stack. The network protocol stack defines a data flow path through which data is passed between a transport layer and a physical device connected to a network. Generally, a network protocol stack comprises a transport layer driver, one or more link layer intermediate drivers, and a link layer device driver interfacing with the physical hardware or device. The link layer intermediate driver receives data and returns processed data through an abstract interface while a link layer device driver is comprised of an interface with the abstract interface and a separate interface with the physical device. The abstract interface is comprised of a function library, which handles many of the details involved in managing synchronous and asynchronous communications across a network. The abstract interface also provides a library of functions for interfacing with the kernel mode of an operating system. Device drivers, therefore, need only perform hardware-specific operations needed to manage a particular piece of hardware or physical device. In contrast, traditional drivers inherently incorporate most of the above functionality, which makes such device drivers much harder to write to and debug, and these device drivers often operate slower.

Essentially, Hyder et al. discloses providing a driver library separate from a device driver. However, as more fully discussed below, **Hyder et al. does not disclose, teach, or suggest a device driver monitor and control management system that monitors information provided by and actions performed by device drivers and that issues messages to device drivers**, let

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alone such a device driver monitor and control management system in communication with device drivers.

U.S. Patent 5,978,815 (Cabrera et al.)

Cabrera et al. purportedly discloses a model where a plurality of drivers or client processes cooperate to fulfill an input/output ("I/O") request. The drivers or data managers may have a layered relationship to each other such that each is responsible for processing a particular portion of an I/O request. Information may be passed from one driver to another driver using I/O request packets ("IRPs") so that all drivers cooperate to fulfill an I/O request.

Like Hyder et al., Cabrera et al. does not disclose, teach, or suggest a device driver monitor and control management system that monitors information provided by and actions performed by device drivers and that issues messages to device drivers.

Rejection of Claims 1-5, 7-9, 12, 20 and 22 Under 35 U.S.C. § 102(e)

As noted above, independent Claims 1, 20, and 22 have been amended to more clearly point out and distinctly claim the present invention. For the reasons set forth below, applicants respectfully submit that the 35 U.S.C. § 102(e) rejection of Claims 1, 20, and 22 and the claims dependent from Claim 1, listed above, particularly as amended, is clearly in error, should be withdrawn, and these claims allowed. These claims are clearly not anticipated by Hyder et al. More specifically, as an example, as amended, Claim 1 reads as follows:

> 1. A computer-readable medium having computer-executable components, comprising:
>
> a device driver configured to provide information and perform actions associated with a hardware device; and
>
> a driver library containing software routines for making the information provided by and the actions performed by the device driver accessible to a device driver monitor and control management system that monitors information provided by and actions performed by the device driver and that issues messages to the device driver, the software routines of the library being accessible by the device driver to handle messages issued to the device driver by the device driver monitor and control management system.

Claim 1, as amended, recites a "device driver monitor and control management system that monitors information provided by and actions performed by the device driver and that issues messages to the device driver." Similar language has been added to Claims 20 and 22. Hyder et al. has no teaching or suggestion of such a device driver monitor and control management system, much less a device driver monitor and control management system that monitors

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information provided by and actions performed by a device driver and that issues messages to the device driver. Applicants submit that the Office Action's conclusion that TRANSPORT 132, FIGURE 2, is a teaching of a device driver monitor and control management system of the type recited in independent Claims 1, 20, and 22 is clearly in error. More specifically, applicants respectfully submit that TRANSPORT 132 is clearly not a device driver monitor and control management system that monitors information provided by, and actions performed by, a device driver and that issues messages to a device driver. In this regard, attention is directed to Column 5, lines 53-59, of Hyder et al. which reads as follows:

> A transport layer driver 132 receives data destined for dispatch across a network via hardware or physical devices such as physical devices 152 and 154. Transport layer driver 132 performs packetization and formatting of bulk data into packets compatible for transfer across a network. Transport layer driver 132 is responsible for implementing a specific network protocol such as TCP/IP or IPX/SPX.

In other words, TRANSPORT layer 132 simply performs bulk data formatting and packets the formatted data into packets compatible for transfer across a network. Transport layer 132 is not a device driver monitor and control management system, much less a device driver monitor and control management system **that monitors information provided by and actions performed by a device driver and issues messages to a device driver** as recited in Claims 1, 20, and 22. As a result, applicants respectfully submit that Hyder et al. does not teach or even suggest all of the recitations of Claims 1, 20, and 22. Because Hyder et al. does not anticipate these claims, applicants further submit that the rejection of Claims 1, 20, and 22 under 35 U.S.C. § 102(e) is clearly in error, request that this rejection be withdrawn, and Claims 1, 20, and 22 allowed.

As Claims 2-5, 7-9, and 12 all depend from allowable Claim 1 and, thus, are submitted to be allowable for at least the reasons noted above.

Claims 2-5, 7-9, and 12 all contain additional recitations that further distinguish them from the teachings of Hyder et al. and, thus, are submitted to be allowable for additional reasons. For example, Claim 7 recites that a unique software routine (added in Claims 2 and 3, the claims from which Claim 7 depends) "is configured to execute a method associated with the information associated with the hardware device, the method being operative to pass additional information between the device driver and the device driver monitor and control system or perform a certain action." There is no teaching, disclosure, or suggestion in Hyder et al. of a software routine that is configured to execute a method associated with the information associated with the hardware device, and operative to pass additional information between the device driver and a device driver monitor and control management system that performs the functions recited in Claim 1.

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Hyder et al.'s purported teaching of communication between drivers (Column 6, lines 13-48) is not a teaching or suggestion of communication with a device driver monitor and control management system. Hyder et al. merely teaches that one driver may pass a message to another driver. There is no hint in Hyder et al. of any device driver monitor and control management system, much less a device driver monitor and control system that monitors information provided by and actions performed by a device driver and that issues messages to a device driver, or of passing additional information to such a device driver monitor and control system, as recited in Claim 7. Accordingly, Claim 7 and its dependent claim, Claim 8, are submitted to be allowable for this reason as well.

Rejection of Claims 6, 10-11, 13-19, 21, and 23 Under 35 U.S.C. § 103(a)

Independent Claims 13, 21, and 23 have been amended to more clearly point out and distinctly claim the present invention. For the reasons set forth below, applicants submit that the 35 U.S.C. § 103(a) rejection of these claims, and the claims dependent from Claim 1 listed above, particularly as amended, is clearly in error, should be withdrawn, and these claims allowed. Neither Hyder et al. nor Cabrera et al., taken alone or in combination, teaches or suggests the subject matter of these claims. More specifically, by way of example, as amended, Claim 13 reads as follows:

> 13. A computer-readable medium having computer-executable instructions for providing management information to a device driver monitor and control management system that monitors information provided by and actions performed by the device driver and that issues messages to the device driver, which, when executed, comprise:
>
> receiving an input/output request packet ("IRP") message from the device driver monitor and control management system, the IRP message including instructions regarding data maintained by an instrumented hardware device;
>
> passing the IRP to a driver library containing software routines for handling the instructions of the IRP message; and
>
> handling the IRP message by the driver library.

As already noted above with regard to Claim 1, Hyder et al. does not teach, disclose, or suggest a device driver monitor and control management system that monitors information provided by and actions performed by a device driver and that issues messages to a device driver. Thus, Hyder et al. does not teach, suggest, or disclose providing management information to such a device driver monitor and control management system. Nor does Cabrera et al. teach, disclose, or suggest this subject matter. In this regard, applicants specifically

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disagree with the Office Action's assertion that Cabrera et al.'s "client process" is a management system. Even if correct, which applicants specifically deny, Cabrera et al.'s "client process" is not a device driver monitor and control system that monitors information provided by and actions performed by a device driver and that issues messages to a device driver .

No reasons why it would have been obvious to combine the teachings of Hyder et al. with the teachings of Cabrera et al. are presented in the Office Action, and applicants maintain that there is no motivation to combine such teachings. Further, even if combinable, which applicants deny, the resulting combination would not anticipate the recitations of independent Claims 13, 21, and 23 for the reasons discussed above with respect to Claims 1, 20, and 22. None of the cited and applied references discloses, teaches, or even remotely suggests receiving an input/output request packet ("IRP") message from a device driver monitor and control management system that monitors information provided by and actions performed by a device driver and that issues messages to a device driver as recited in Claims 13, 21, and 23. As neither Hyder et al. nor Cabrera et al., alone or in combination, teaches, discloses, or suggests any IRP message from or to such a device driver monitor and control management system, Claims 13, 21, and 23 are submitted to be allowable.

As Claims 14-19 all depend from Claim 13, Claims 14-19 are submitted to be allowable for at least the reasons noted above. Additionally, Claims 6 and 10-11 are submitted to be allowable as they depend from Claim 1, which is submitted to be allowable for the reasons noted above.

Furthermore, Claims 6, 10-11, and 14-19 include recitations that further distinguish them from the teachings of Hyder et al. and Cabrera et al. and, thus, are submitted to be allowable for additional reasons. For example, Claim 11, which depends from Claim 1, recites "the driver library is further configured to receive, from the device driver, an identifier for a particular IRP, to execute a particular software routine related to handling the IRP and to **return to the device driver monitor and control management system** any information received from the hardware device as a result of handling the IRP" [emphasis added.]. As noted in a prior response, neither Hyder et al. nor Cabrera et al. teaches, discloses, or suggests returning to a device driver monitor and control management system any information retrieved from a hardware device, regardless of the form of the information. Accordingly, Claim 11 is submitted to be allowable for this reason as well.

As a further example, Claim 19, which depends from Claim 18 (which depends from Claim 13) recites "the driver library is further configured to format data received from the device driver in a format consistent with the device driver monitor and control management system."

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Hyder et al. merely teaches "decoding and branching to the applicable operative procedure." Nowhere does Hyder et al. teach data formatted into a format consistent with a device driver monitor and control management system that monitors information provided by and actions performed by a device driver and that issues messages to a device driver. As neither Hyder et al. nor Cabrera et al. teaches, discloses, or suggests data formatted into a format consistent with such a device driver monitor and control management system, Claim 19 is submitted to be allowable for this reason as well.

CONCLUSION

In summary, applicants submit that Claims 1-23 are clearly allowable in view of a lack of teaching or suggestion of a device driver monitor and control management system that monitors information provided by and actions performed by a device driver and that issues messages to a device driver in combination with the other recitations of these claims.

In view of the foregoing remarks, applicants submit that the present application is now in condition for allowance. Reconsideration and reexamination of this application, as amended, allowance of the rejected claims, and passage of the application to issue at an early date are respectfully solicited. If the Examiner has any questions or comments concerning this application, the Examiner is invited to contact the applicants' undersigned attorney at the number below.

Respectfully submitted,

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I hereby certify that this correspondence is being deposited with the U.S. Postal Service in a sealed envelope as first class mail with postage thereon fully prepaid and addressed to the Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450, on the below date.

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